

(No Model.)

J. DESMOND.

AUTOMATIC CONTROLLING DEVICE FOR BOILER FEEDERS.

No. 521,644.

Patented June 19, 1894.

Fig. 1.

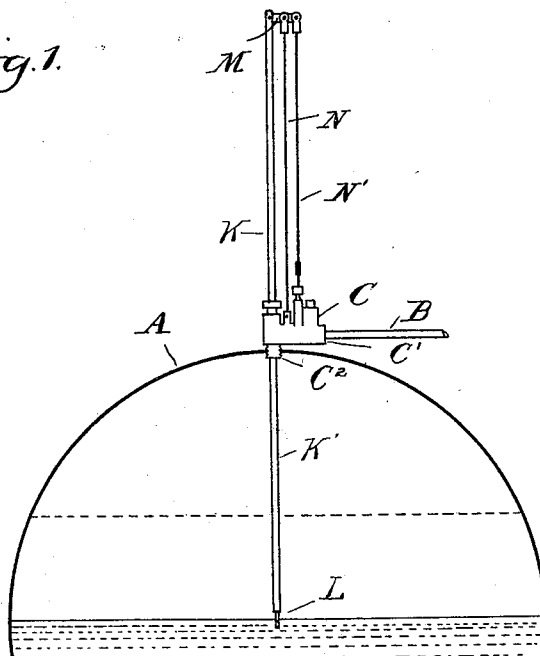
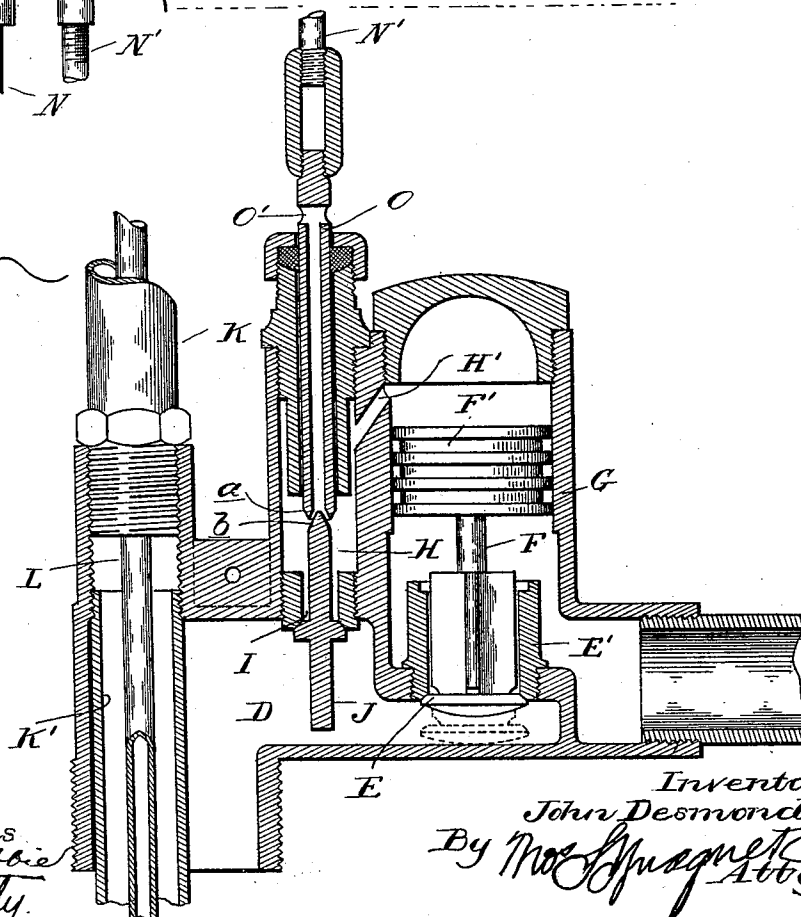


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN DESMOND, OF DETROIT, MICHIGAN, ASSIGNOR TO THE PENBERTHY INJECTOR COMPANY, OF SAME PLACE.

AUTOMATIC CONTROLLING DEVICE FOR BOILER-FEEDERS.

SPECIFICATION forming part of Letters Patent No. 521,644, dated June 19, 1894.

Application filed August 26, 1893. Serial No. 484,123. (No model.)

To all, whom it may concern:

Be it known that I, JOHN DESMOND, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Automatic Controlling Devices for Boiler-Feeders, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention consists in the peculiar construction of a valve for supplying steam to an injector or steam pump for supplying water to a steam generator and the controlling mechanism for said valve, whereby upon the
15 lowering of the water in the boiler, steam is supplied to the boiler feed, injector or pump, and upon the rising of the water therein the steam is shut off therefrom.

20 The invention further consists in the peculiar construction, arrangement and combination of the various parts, all as more fully hereinafter described.

25 In the accompanying drawings, Figure 1 is an elevation of my improved device showing it as applied in use. Fig. 2 is a vertical, central section therethrough, partly in elevation.

A represents the shell of the boiler or steam generator.

30 B represents a supply pipe leading to an injector or boiler feed pump which discharges into the boiler, the pump and its connections not being shown.

35 C is a valve casing having a nipple C' into which the pipe B engages and a nipple C² entering in a steam space in the boiler.

D is a passage in the casing of the valve connecting the two nipples.

40 E is a valve disk controlling said passage way D and seated against the lower end of the ring E'. The valve E is provided with a stem F which at its upper end carries a piston F' moving in a cylinder G.

45 H is a chamber in the casing beside the cylinder G. This cylinder connects at its upper end through the port H' with the cylinder G above the piston and by a passage or port I, at its lower end it connects with the passage D.

50 J is a valve controlling the passage or port I. This valve is seated upwardly by the steam pressure in the chamber D, as is the valve E. The valve J is opened upon the lowering of

the water in the boiler by any suitable automatically actuated low water device; that which I have shown consisting of an expandible tube K secured into the valve casing
55 and extending upwardly therefrom, and a pipe K' forming a practicable continuation of the pipe K extending from the valve casing into the boiler having its lower end at a point below which it is not desired to have the wa-
60 ter lower.

L is a pipe of smaller diameter than the pipes K K' and extending therethrough near the top thereof, having its lower end projecting beyond the lower end of the pipe K'.
65 The function of this pipe L is to form a vent or overflow for any condensation which may accumulate in the pipe K. The pipe K at its upper end is connected to a lever M which is fulcrumed on the rod N secured at its lower
70 end to the casing.

N' is an actuating rod extending from the free end of the lever M downward and connected to the tubular stem O, which passes through a suitable stuffing box. In the upper
75 end of the passage H, the stem is provided with a vent aperture O' near its upper end and at its lower end it is provided with a seat *a* adapted to engage upon a conical seat *b* at the upper end of a stem projecting above the
80 valve J.

The parts being thus constructed their operation is as follows: In the normal position of the water the steam condensing in the pipes K K' will fill those pipes with water
85 which will maintain the pipe K outside of the boiler at substantially a low temperature. When the water lowers beyond the lower end of the pipe K' the lower end of the pipe L will still be submerged and the steam enter-
90 ing the lower end of the pipe K' will force out the water through the pipe L filling the pipes K K' with steam and causing the expandible pipe K to rock the lever M by its expansion, lowering the stem O and closing
95 the passage-way therethrough by the engagement of the seat *a* upon the conical seat *b* on the stem of the valve J. Further movement of the stem O will open the port I allowing steam to enter from the generator into the
100 passage D passing thence through the port I, the chamber H and the port H' into the top

of the cylinder G, the piston F' being of larger area than the valve disk E, and being now subjected to the steam pressure, (that is the boiler pressure) it will force the valve E from its seat and allow steam to pass from that valve into the supply pipe D to the injector in large volume sufficient to positively start the injector at work and supply water to the boiler until the water has reached a height upon the tube K' sufficient to allow the pipe K to cool, and in contracting lift the stem O permitting the steam pressure to close the valve J and withdraw the seat *a* from the seat *b* on the stem of that valve, thus opening the vent O' allowing the steam above the piston F' to escape through that vent when the pressure on the under side of the piston F' and the valve E will close that valve and shut off the supply of steam to the injector.

Heretofore automatic devices which have been used for supplying steam to the injectors upon the lowering of the water in the boiler have embodied a controlling valve which would gradually open, thereby first admitting but a small amount of steam to the injector. Such a device in practice it has been found simply fills the injector with condensation thereby heating the same, which prevents its proper operation. With my device the valve E controlling the passage through the injector is not opened until the pressure on the piston F' overcomes the pressure on valve E and being of much larger area will force that valve quickly from its seat admitting at once a large volume of steam which will start and positively operate the injector at all times.

I do not herein claim the construction of the automatic device for actuating the valve J, as the same is not my invention, and any other form of actuating device may be substituted.

What I claim as my invention is—

1. The combination of a steam supply valve

normally held closed by the boiler pressure, a piston for actuating said valve, an auxiliary valve for controlling a port supplying steam to the main valve piston and normally held closed by the boiler pressure, and mechanism for actuating said auxiliary valve controlled by the height of the water, substantially as described.

2. The combination of a steam supply valve normally closed by the boiler pressure, a piston for opening said valve, a cylinder in which said piston works, an auxiliary valve controlling a port for supplying steam to said cylinder and normally held to its seat by the boiler pressure, mechanism for actuating said auxiliary valve controlled by the height of the water, and a vent from the cylinder, opened only on the closing of the auxiliary valve, substantially as described.

3. The combination of a steam supply valve, normally closed, a piston for opening said valve, an auxiliary valve for controlling a port supplying steam to the main valve piston, and a thermostat controlled by the height of the water for actuating said auxiliary valve, substantially as described.

4. The combination of the valve casing, the main steam valve therein, the cylinder above said valve, the piston therein, an auxiliary valve for controlling a supply port to said cylinder, the actuating mechanism for said auxiliary valve comprising a thermostatic device controlled by the height of the water, the hollow stem actuated thereby, having the vent O, and the conical bearing *b*, on the stem of the valve J, controlling said vent, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN DESMOND.

Witnesses:

JAMES WHITEMORE,
M. B. O'DOHERTY.